NAVAL HEALTH RESEARCH CENTER

PERSONALITY AND SUCCESS AMONG MILITARY

ENLISTED PERSONNEL: AN HISTORICAL

PROSPECTIVE STUDY OF U. S. NAVY CORPSMEN

R. R. Vickers, Jr.
L. K. Hervig
R. F. Booth

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Personality and Success Among Military Enlisted Personnel:
An Historical Prospective Study of U.S. Navy Corpsmen

Ross R. Vickers, Jr.[1]
Linda K. Hervig[1]
Richard F. Booth[2]

Human Performance Department[1]
and
Information Systems Department[2]
Naval Health Research Center
P. O. Box 85122
San Diego, CA 92186-5122

SUMMARY

Problem

Early identification of people who will perform reliably during their Navy career would be a useful selection and assignment tool. Validated tools currently are not available.

Objectives

Recent meta-analyses indicate that standard personality measures predict organizational performance variables, particularly organizational delinquency behaviors, such as absenteeism, drug abuse, and alcohol problems. This study was undertaken to evaluate the potential for developing screening/selection tools to predict these behavioral components of unreliability in U.S. Navy personnel.

Approach

Personality was measured by the Comrey Personality Scales which include scores for eight general personality domains and for specific personality facets within the domains. Reliability was operationalized as a set of career events defining a career sequence. These events included successful completion of A school, completion of the first-term enlistment, paygrade at the end of the first tour, being recommended for reenlistment, and reenlisting. Personality measures were used to predict each career event. This approach was chosen to test a bandwidth-fidelity hypothesis which asserts that specific elements of personality must be used if one is to predict specific behavioral criteria.

Results

Personality measures predicted early career events (i.e., school success, premature attrition) better than later events (i.e., reenlistment). The bandwidth-fidelity hypothesis was supported by evidence that facet-level scales were better criterion predictors than domain level scales. The hypothesis also was supported by the fact that different career criteria had different sets of predictors and that personality predicted premature attrition for behavioral problems, but did not predict premature attrition for medical problems and/or convenience of the government. Personality predicted school success, attrition, and end-of-tour paygrade (among those who completed their full tour) even after controlling for differences in mental ability.

Conclusions

Properly chosen personality variables can predict the career outcomes that define reliable performance. Prior research generally violates the bandwidth-fidelity principle of prediction and, therefore, underestimates the potential value of personality screening. The present study illustrates the potential gains from applying this principle and provides a starting point for systematic application of this principle to provide optimal screening/selection tools to predict reliability.

A successful military career requires service personnel to perform well under a wide range of stressful conditions. Initial stresses encountered in the transition from civilian to military life during basic training are followed by the physical and psychological challenges of military training and operations in extreme environments, while separated from family, and so on. Interspersed with periods of exceptional demand are periods of routine, even humdrum, work. A typical career also involves moving from positions requiring the incumbent to be a good follower to positions requiring the incumbent to provide leadership. Frequent family separations, geographical mobility, and other elements of military life provide additional adaptational challenges.

Methods of forecasting success in adapting to the challenges of a military career could support critical personnel selection and assignment decisions. Forecasting models based on demographic characteristics are a logical approach given the ease of extracting information for the development of such models from standard data bases. However, career success can vary widely within demographically defined groups. For example, LaRocco, Pugh, and Gunderson (1977) found that blacks were more likely than other sailors to be discharged prior to completing their obligated service. However, blacks who completed their service were more likely to reenlist. In a case such as this, better forecasting requires some means of accounting for differences in military outcomes within sociodemographic groups.

Individual differences in personality may provide clues to the likelihood of success in a military career. The existence of a substantial body of evidence indicating that personality affects job performance (Barrick & Mount, 1991; Kamp & Hough, 1986; Tett, Jackson, Rothstein, & Reddon, 1994) provides one basis for this claim. The fact that personality is related to vocational interests (Holland, 1985) suggests that a mismatch between job and personality might adversely affect motivation and performance. Finally, personality disorders are a major contributor in premature attrition from the military (Klein, Hawes-Dawson, & Martin, 1991), an outcome that clearly precludes a successful career. In general, any attribute of the individual that affects job preference, job performance, and/or general adaptability arguably has implications for the individual's ability to adapt to the military.

The present study examined the relationship between personality and the first-term enlistment success of U.S. Navy corpsmen. The general approach was to isolate key events in the enlistment as elements of a career sequence. Personality correlates of each event were identified to provide the basis for a step-by-step model for predicting cumulative career progress. The rationale for focusing on specific events rather than a cumulative outcome (e.g., successful completion) is given in the following section of the introduction.

The Career Sequence Perspective

Figure 1 outlines a general career sequence as a framework for the present investigation. The sequence is anchored by entry into specialty training (i.e., A school) and first-term reenlistment because this period is the focus of this study.
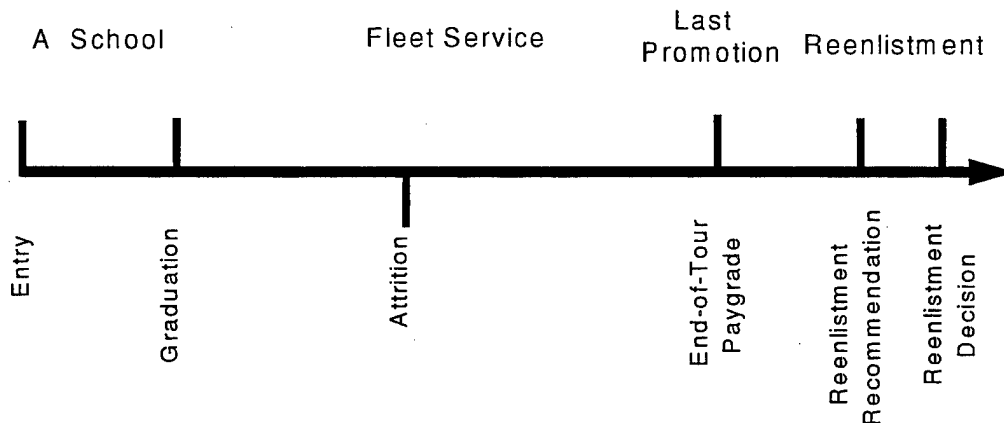
Figure 1. Conceptual representation of career sequence. Figure indicates the general structure of the first-term enlistment for U.S. Navy hospital corpsmen. Events coded as career success indicators are shown in the figure. Not all events apply to all individuals (e.g., sailors who attrite are not involved in reenlistment decisions). Distances between events are not proportional to actual elapsed time. See Methods for definitions of variables derived from the data.

The fleet service portion of this career period consists of a variety of events summarized in the figure by two outcomes. Attrition occurs when the individual is discharged from the service prior to completing his/her obligated service. End-of-tour paygrade indexes overall performance during the enlistment. Paygrade is a meaningful index of performance if it can be assumed that promotion occurs after a period of successful performance of duties at a lower level and is accompanied by assignment to more tasks requiring greater expertise and responsibility.

The career sequence becomes a career track if the person stays within a specific occupational specialty. In this case, the person enters the service, trains for his/her specialty, then advances in that specialty to the end of his/her service time. If the sailor completes the full term of enlistment, the end of his/her tour of duty is the time for the reenlistment recommendation and the reenlistment decision. Those who elect to reenlist continue further down the track as indicated by the arrow pointing to further service. The use of the term "track" is intended to imply the sequential, guided structure of these events.

The career sequence perspective raises the possibility that different personality variables are relevant to success at different times in a sailor's career. What makes a good student is not necessarily what makes a good medical care provider in the Fleet or Fleet Marine Force.

The career sequence perspective also implies that people moving to other career tracks should be dropped from comparisons as the career progresses. Individuals who stay on track face similar demands and experiences. People on other tracks may face quite different

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circumstances. Personality effects on behavior should be more evident when situational factors are similar for all of the people being studied. When situations are held constant, personality and ability differences must be the source of any nonrandom individual differences in behavior (Golding, 1975). People who remain on the same career track face comparable regulations affecting reenlistment, job opportunities within the Navy, job opportunities in civilian life, and other such factors. Differences within a career track, therefore, are a reasonable place to look for the effects of personality on career outcomes.

The career sequence perspective also is consistent with organizational concerns. Who is to be promoted? Who should be assigned to which duty station? Answers to these questions are constrained by who remains within the occupational group at the time the question is posed. Dropping people who get sidetracked at various points in the career sequence focuses on those remaining in a specialty. These sailors are the ones that detailers consider when making choices that distribute resources across the service.

Personality and Career Events

Personality clearly affects some elements of the career sequence. Personality effects on training performance have been extensively documented (Barrick & Mount, 1991; Kamp & Hough, 1986; Tett et al., 1994). Personality also is an established predictor of job delinquency behaviors, including absenteeism, drug usage, and other common behavioral problems (Kamp & Hough, 1986). These behaviors can be expected to lead to attrition. These reviews of prior literature include demonstrations that results obtained in studies of military personnel are comparable to those obtained in studies of civilian personnel (Kamp & Hough, 1986), so the general results of the meta-analytic reviews provide a reasonable basis for predicting the overall pattern of relationships between personality and Navy job performance in general. The predictions derived from these reviews are shown in the first column of Table 1.

Table 1

Personality-Performance Predictions for Corpsmen

| | Hypotheses Derived From Literature on: | | |
	General job performance	Vocational interests	Combined
Emotional stability	++	0	++
Extroversion	+	+	+
Openness to experience	0	+	+
Agreeableness	0	*	0
Conscientiousness	++	*	++

Note. Entries indicate general personality-performance hypotheses for Navy corpsmen. "++" indicates a relatively strong relationship, "+" a moderate relationship, and "0" a null relationship. "*" indicates no prediction made.

General hypotheses derived from meta-analyses of prior research on personality and job performance (Barrick & Mount, 1991; Kamp & Hough, 1986; Tett et al., 1994) are shown in Table 1. This hypothetical profile characterizes performance in terms of the five-factor model (FFM) of personality (Digman, 1990; John, 1990; Goldberg, 1993). The FFM focuses on five higher-order domains as a reasonably comprehensive model for personality assessment. The profile can be interpreted by considering the following definitions of the five major personality domains comprising the model:

Emotional stability/neuroticism assesses differences in the frequency and intensity of negative emotions, such as depression, anxiety, and anger, and the ability to function under stress.

Extroversion/introversion assesses differences in interaction styles, contrasting gregariousness, assertive behavior with a preference for solitary pursuits. Positive emotional tendencies and a liking for excitement are other elements of extroversion.

Openness to experience/rigidity contrasts individual differences in seeking out a wide range of experiences, including novel experiences, with a preference for the tried and true. This dimension also contrasts daydreamers with people who stay busy with concrete tasks and people who are tolerant of a wide range of ideas and values with those who tend to believe in a single right way of viewing the world.

Agreeableness/disagreeableness is an interpersonal dimension like extroversion/introversion. Agreeable individuals are cooperative and see others sympathetically as trustworthy and deserving of courtesy. Disagreeable individuals are skeptical, cynical, rude, and antagonistic.

Conscientiousness/unreliability combines two general elements of behavior. Conscientious individuals are motivated to strive for difficult goals and tend to do so in a structured, orderly fashion that is a component of their general behavioral style. Unreliable individuals are likely to fail to complete tasks, particularly difficult ones, and are sloppy and inconsistent in their work patterns and social behaviors.

Profile of an Effective Hospital Corpsman. General hypotheses may not apply to specific jobs, because different jobs make different demands on incumbents. For this reason, Table 1 presents a second set of hypotheses based on relationships between personality and vocational interests. People should perform best when their job requires them to perform duties that are consistent with their personality. Mismatch between personality and job requirements can lead to poor performance through impaired motivation and other factors. Even if mismatched individuals do perform satisfactorily, they should be less likely to reenlist. With this possibility in mind, Holland's (1985) model of the personality and interest characteristics of medical support personnel (i.e., general duty nurse, rehabilitation therapist, dental assistant, licensed practical nurse, medical records librarian, dental hygienist) was translated into an abbreviated FFM personality profile based on the findings of Costa, McCrae, & Holland (1984). A full FFM profile was not possible because the personality assessment used in the study covered only the emotional stability, extroversion, and openness FFM components.

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Medical jobs generally have investigative and social components as the first and second elements of Holland's (1985) three-letter codes. Artistic and realistic components comprise the third element of the profiles. The investigative and artistic components of these profiles suggest that people with high openness scores should be more comfortable in these occupations than should people who are relatively rigid. However, openness scores were more strongly related to the artistic tendencies than to investigative tendencies. The social component should be related to extroversion, although it is worth noting that extroversion was even more strongly related to the tendency to be enterprising. This latter point is noteworthy because enterprise is not a key element of medical profiles. Thus, the vocational interest domains that were relevant to the corpsman job were clearly related to extroversion and openness, but other vocational interest domains were more strongly related to both personality dimensions. This mixed picture is represented in Table 1 by the expectation that modest relationships would be observed in these two domains.

An Integrated Predictive Profile. The combined profile shown in the third column of Table 1 was constructed to integrate the general job performance profile and the vocational interest predictions. The combinatorial rule was that relationships based on meta-analytic findings would be more likely to generalize across jobs and were based on more extensive data. Generalizability was judged important because not all corpsmen work in typical health care settings. The job of a corpsman with a Marine Corps battalion or on board a deployed Navy ship can be quite different from that of the typical nurse or medical technician in a hospital. Results that generalize across different jobs seemed likely to generalize across these situational circumstances as well. Based on personality-performance meta-analyses, the expectation was that success would be greater for emotionally stable, conscientious individuals. Vocational interest evidence suggested that extroversion and openness may be vocation-specific elements of a successful corpsman profile. A null relationship was predicted for agreeableness because prior research provided no strong evidence that this variable affects job performance in general or that it was relevant to the specific vocation in question.

The Bandwidth-Fidelity Trade-off

The hypothetical profiles presented in Table 1 involve very general, abstract personality variables. Funder (1991) has noted that this level of analysis and measurement may be less useful for predicting specific performance criteria than analysis and measurement at a more detailed level. This observation is summarized in a bandwidth-fidelity principle involving two major assertions.

Personality measurement models typically provide a basis for testing the bandwidth-fidelity principle. Most measurement models are hierarchical. The highest level of the hierarchy consists of three to eight abstract constructs that encompass a broad range of behaviors. A second hierarchical level divides the higher-order domains into more specific constructs, each encompassing a relatively narrow range of specific behaviors. For example, emotional stability might be divided into assessments of depression, anxiety, anger, hope, or other similar constructs. Systematic sampling of specific constructs, variously referred to as facets (Costa & McCrae, 1992), homogenous item composites (i.e., HICs; Hogan & Hogan, 1992), or factor-homogenous item dimensions (i.e., FHIDs; Comrey, 1970), is common even in models developed using the FFM as

the primary frame of reference (Costa & McCrae, 1992; Hogan & Hogan, 1992). The term "domain" will be used in this paper to designate scales assessing individual differences at the most abstract level of the hierarchy. "Facet" will be used to designate measures representing the second level of the hierarchy.[1]

The bandwidth-fidelity trade-off involves two broad assertions about the predictive utility of domain and facet scales. First, domain scales can be expected to predict a wide range of behaviors, but with low precision for any specific behavior. Second, facet scales can be expected to predict specific behaviors with more precision, but each facet will be relevant to a limited number of behavioral criteria.

The bandwidth-fidelity trade-off implies that the hypothetical profiles in Table 1 are general guidelines only. The profiles indicate the domains most relevant to performance, but the profiles do not specify the facets pertinent to predicting specific criteria. Testing the assertion that the profile should be expressed in terms of facet scales is one important study objective.

Study Overview

This study combined the career sequence perspective with a hierarchical conceptualization of personality to predict success among U.S. Navy corpsmen. First-term enlistees are examined from entry into the corpsman career track through reenlistment decisions. Personality is examined as a predictor of specific events using a hierarchical measurement model for personality. The hierarchical model makes it possible to evaluate the bandwidth-fidelity trade-off as a concern for personnel decisions. This evaluation is based on the relative predictive utility of measures representing the domain and facet levels of personality assessment.

Methods

Sample

The individuals studied were selected from a sample of 6,303 male sailors who entered the Navy corpsman A school between October 1972 and December 1973. Selection criteria were imposed to define a group that entered the service with comparable status and presumably, therefore, equal opportunities for advancement, reenlistment, and other factors which might affect their careers. As shown in Figure 2, the selection criteria were type of enlistment, initial Navy rate code, length of tour of duty, and entry paygrade. The analysis sample was restricted to the 4,512 men who were enlisting for the first time, were not reservists, entered the service as a seaman recruit (Rate Code = 3600) with a 4-year term of enlistment starting as an E-1 paygrade. Figure 1 provides a flow chart showing the effects of imposing these criteria. The figure also includes information on events defining the career pipeline concept. This information was used to construct career advancement indicators described in the Career History section of these Methods.

The decision to restrict the sample was made because career events would be difficult to interpret without such restriction. Matched starting points were needed to make career progression indicators more meaningful

Initial Sample

Oct '72 - Dec '73 Entries (N = 6,303)

Enlistment Type

Reenlistment (N = 20) · 1st Enlistment (N = 5,759) · Reserves (N = 524)

Entry Rate Code

3600 (N = 5,674) · Other (N = 85)

Length of Tour

2-/3-year (N=293) · 4-year (N = 5,340) · 6-year (N = 41)

Entry Paygrade

E-1 (N = 4,512) · E-2 (N = 352) · E-3 (N = 476)

A School

Failure (N = 1,466) · Success (N = 3,046)

End-of-Tour Rate Code

3600 (N = 108) · Medical (N = 2,879) · Other (N = 43)

End-of-Tour Paygrade

E-1/E-2 (N = 46) · E-3 (N = 356) · E-4 (N = 1,531) · E-5 (N = 370)

Early Discharge (N = 576)

Reenlistment Status

NR = 28, R/NR = 17, Reen = 1 · NR = 45, R/NR = 269, Reen = 42 · NR = 55, R/NR = 1,077, Reen = 399 · NR = 1, R/NR = 249, Reen = 120
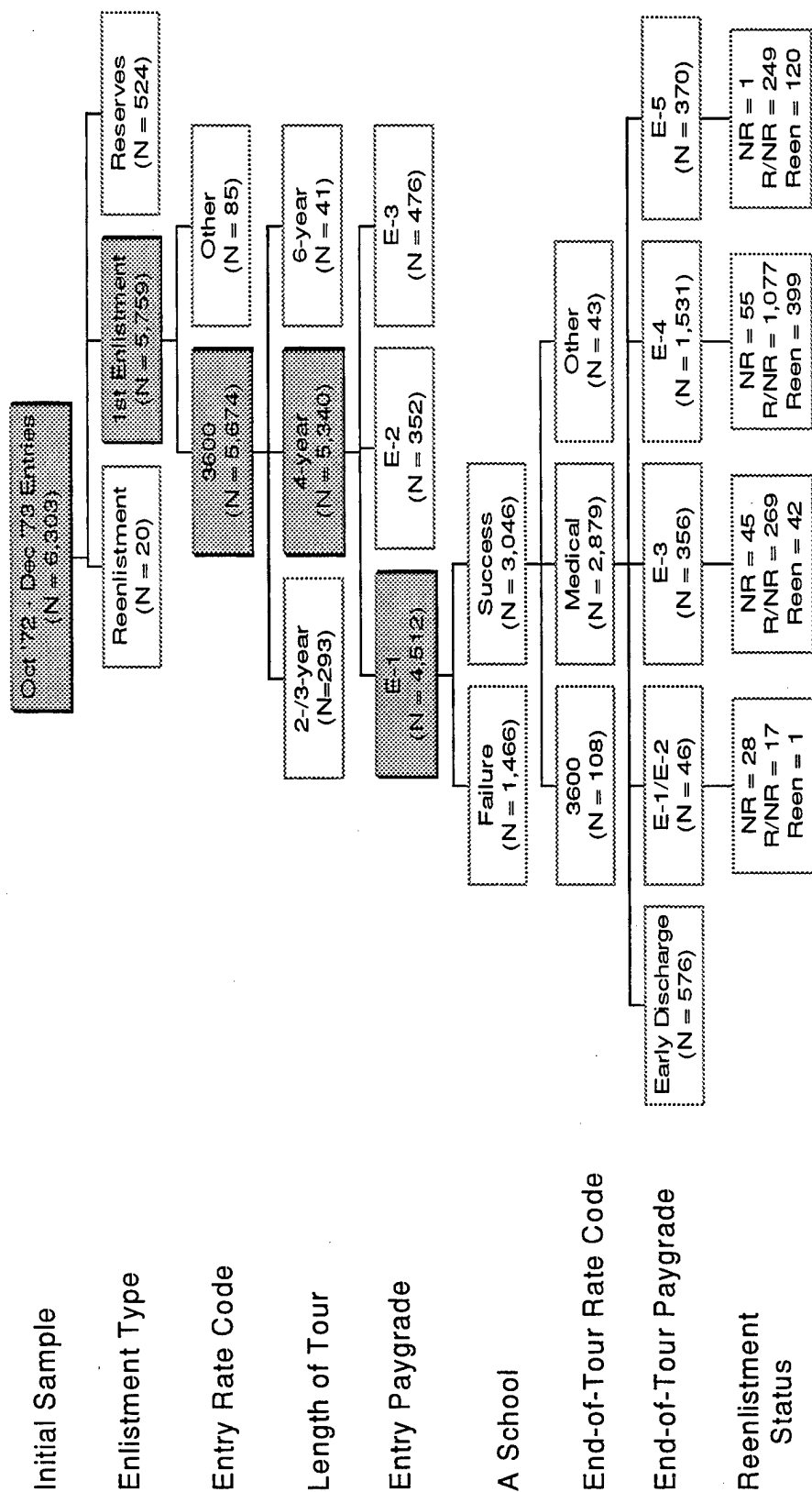
Figure 2. Sample selection and career sequence overview. Shaded boxes indicate selection sequence for identification of primary sample. "NR" = Not recommended. "R/NR" = Recommended, Not Reenlisted. "Reen" = Reenlisted. See text for details.

by equating opportunity. For example, advancement from one paygrade to another involves time in grade as one criterion for eligibility. The length of time in grade required to be eligible for promotion varies depending on current paygrade. Thus, a person who entered as an E-1 would be eligible for promotion sooner than one who entered as an E-2. If the sample were not matched for initial status, some adjustment for initial differences in paygrade would be needed.

Personality Inventory

The Comrey Personality Scales (CPS; Comrey, 1970) provided the personality measures for this study. The CPS measures individual differences along dimensions defining eight general personality domains. Each general domain encompasses five specific attributes (referred to as "factor-homogenous item dimensions" or FHIDs). Each FHID scale has 4 items for a total of 20 items per general domain. Twenty additional items provide validity scales. Subjects respond to items on 7-point Likert scales. Depending on the content of the item, the response options ranged from "Never" (1) to "Always" (7) with "Occasionally" (4) as a central intermediate response or from "Definitely not" (1) to "Definitely" (7) with "Possibly" (4) as the central intermediate response. Cronbach's alpha, a measure of internal consistency, had a median value of .773 (range = .635 to .898) for the general dimensions in the present sample. The FHID scales had lower Cronbach's alphas with a median of .582 (range = .281 to .812). The factor structure of the CPS scales is replicable across samples and populations (Comrey, 1970), including U.S. Navy corpsmen (Booth, 1978).

The CPS scales were suitable for the present purposes because they provide a well-defined, replicable hierarchical representation of personality (Comrey, 1970). Noller, Law, and Comrey (1987) provided a five-factor summary of the CPS scales. This linkage makes the CPS a suitable instrument for testing the general hypotheses outlined in the introduction. In addition, the FHIDs provide the specificity of assessment necessary to test the bandwidth-fidelity principle. It should be noted, however, that the personality attributes measured by the FHIDs were not chosen specifically to predict career criteria. The test of the fidelity principle, therefore, is limited by the possibility that key intradomain elements are missing.

Mental Ability

The Armed Services Vocational Aptitude Battery (ASVAB) provided measures of mental ability. These measures were not directly relevant to the personality hypotheses being tested, but they may be important for valid tests of those hypotheses. School success involves mental ability, and early career advancement requires good performance on standardized tests of knowledge. Cognitive ability is an established predictor of such behaviors (Hunter & Hunter, 1984). Personality measures generally are no more than weakly correlated with mental ability measures, but correlations between the two domains still might produce spurious personality-performance correlations in the present study if the effects of ability on performance are not considered. Personality influences may be evident only when the effects of cognitive ability are controlled.

The selection of ASVAB scores for use in the analyses was based on the finding that measures of 'g' extract most of the predictive value of the battery of tests (Ree & Earles, 1991, 1992; Ree, Earles, & Teachout,

1994). Analyses employed General Classification Test (GCT) and Armed Forces Qualifying Test (AFQT) scores as markers for mental ability. GCT is a 100-item composite of 60 verbal analogies and 40 sentence completion items. The test has a 35-min time limit. AFQT is a measure of general mental ability covering verbal, arithmetic reasoning, tool functions, and spatial relationships. This test has a 50-min time limit. AFQT is highly related to psychometric 'g' (e.g., Ackerman, 1988).

Career History

Events in the participants' careers were determined from the Navy Enlisted History data file maintained at the Naval Health Research Center (Garland et al., 1982). Enlistment data extracted for the present study included date, length of enlistment, rate, and paygrade at enlistment. The same information was extracted for discharges along with the code for reason for discharge and whether the person had been recommended for reenlistment. Dates of promotions and demotions were noted. Information on success in corpsman A school was taken from the school records.

Career sequence was defined by the following information from the enlisted history record:

a. Corpsman School Outcome. Trainees who completed Corpsman school were compared to those who did not using a multivariate analysis of variance (MANOVA) followed by t-tests for individual personality scales. Scoring was "0" for failures, "1" for graduates.

b. Pipeline Shifts. Some sailors who completed school successfully shifted to other occupations before completing their tour of duty. These individuals were classified as pipeline transfers. Transfer status was determined from the history record that indicated the end of the person's enlistment, so transfer was treated as an intermediate step between school completion and end of enlistment. The analyses using this variable involved only the people who completed Corpsman school, so the designation did not confound school failure with transfer. Scoring was "0" for shift to another pipeline, "1" for remaining in the corpsman pipeline.

c. Completion of Enlistment. Trainees who successfully completed Corpsman school then were divided into those who completed their enlistment and those discharged prior to completion. The discharge group was divided into those with adverse discharges and those discharged for reasons unrelated to failure to perform effectively. A three-group MANOVA was followed by one-way analysis of variance (ANOVA) with planned contrasts between the successful individuals and those discharged for behavioral problems. The overall outcome, "Completion of Enlistment," was a dichotomous variable scored "0" for failure to complete, "1" for successful completion.

d. End-of-tour Paygrade. Trainees who completed their enlistment were divided into four groups based on their paygrade at the end of their enlistment. The four groups were E-1/E-2, E-3, E-4, and E-5/E-6.

e. Reenlistment Recommendation. Trainees who completed their enlistment were divided into those who were recommended for reenlistment and those who were not. Scores were "0" for those not

recommended for reenlistment, "1" for those recommended.

f. <u>Reenlistment Decision</u>. Trainees who were recommended for reenlistment were divided into those who reenlisted and those who did not. Scores were "0" for those who chose not to reenlist, "1" for those who chose to reenlist.

Except as noted at specific points in the <u>Results</u>, the pipeline concept of career sequence was operationalized by sequentially applying these steps. All individuals were considered in the analysis of school success, but only those who completed school were considered in the analysis of pipeline transfers. Only those who remained corpsmen to the end of the tour were considered in the completion of enlistment analysis. Sequential elimination of people who dropped out of the corpsman specialty helped ensure that people in the sample were operating under comparable opportunities for advancement and reenlistment. Sequential elimination also reproduces the personnel pool available to detailers and other Navy decision-makers at different career points. For example, only the people remaining on track are available for assignment to jobs requiring the skills and experience of an HM2.

Figure 2 indicates the sample sizes generated by sequential elimination. The figure also illustrates one important exception to sequential elimination. End-of-tour paygrade and reenlistment variables were regarded as occurring at the same point in the career sequence. The analyses for these variables, therefore, included all people who completed their first-term enlistment.

Analysis Procedures

Analyses were performed with the SPSSX data analysis package (SPSS, Inc., 1990). Preliminary tests conducted to determine the replicability of predictor-outcome relationships indicated that the associations were stable in this population (Appendix A). Analysis procedures and results, therefore, are presented for the entire sample.

Analysis procedures addressed two points to provide an overall picture of personality and career trends. First, how useful were personality measures in forecasting specific career events? This question was addressed by comparing groups defined by outcome status at specific career points.

The analyses also addressed the incremental validity of personality measures relative to mental ability. The initial comparisons were repeated controlling for mental ability, an established predictor of job performance (Hunter & Hunter, 1984; Ree & Earles, 1992). The adjusted comparisons were provided by stepwise discriminant function analysis with mental ability measures entered prior to the personality variables.

Standard statistical decision criteria were replaced by effect size criteria. The large sample size made statistical decision criteria (e.g., $p < .05$) of little value for determining which relationships were of theoretical or practical importance. For example, a point biserial correlation as low as $r = .036$ would be significant in the smallest sample used in the analysis.

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Results were interpreted in terms of Cohen's (1969) effect size criteria. These results emphasize behavioral effect size displays (BESDs; Rosenthal & Rubin, 1982) which directly reflect the predictive value of the relationships investigated. In the present case, most relationships are summarized by point biserial correlations which can be interpreted simply as the difference in probabilities of "success" when people above the scale mean are compared to the probability of success for people who score below the mean (Rosenthal & Rubin, 1979, 1982). For correlations, Cohen (1969) recommends r = .10 as the lower boundary for a small effect size. In BESD terms, this criterion is equivalent to a 10% difference in success in the above and below average groups.

Results meeting or exceeding the effect size criterion are labeled "acceptable." This terminology should help minimize misinterpretations that might follow from the use of the more common practice of labeling results significant or nonsignificant. "Significant" commonly refers to a finding that leads to rejection of the null hypothesis of no relationship following a statistical significance test. This common practice made it likely that referring to relatively large deviations from the null as "significant" would predispose readers to confound the current criterion with a significance test. Many results that were not "acceptable" were "statistically significant," so this confounding would be misleading. The term "acceptable" was to remind the reader that the evaluation of results involved comparison of findings to a standard that was not the usual statistical significance test.[2]

Results

Overall Evidence of Personality-Career Event Associations

Bivariate personality-career event associations are shown in Table 2. Associations meeting the effect size criterion are marked with an asterisk. The apparent sparseness of asterisks could be misleading when asking whether personality and events were statistically related. Many unmarked correlations were statistically significant. The cumulative evidence for the presence of nonzero correlations, therefore, is considered briefly to provide context for the later discussion which focuses solely on results that met the acceptability criterion.

The sequential deletion of people lost from the pipeline meant that sample sizes for the criteria ranged from 4,512 for school success to 2,232 for the reenlistment criterion. Samples this large make it possible to reject the null hypothesis even for very small correlations. At the lower end of the sample size range, a correlation of r = .042 is significant at the p < .05 (two-tailed) level. Of the 350 correlations, 140 (40%) exceeded this minimum value. This frequency is 8 times what would be expected by chance. Even more of the correlations would have been significant if the actual sample sizes had been used in place of the smallest sample size and if one-tailed tests had been used in place of the two-tailed test.

Even this conservative evaluation clearly shows that the set of correlations was inconsistent with the assumption that career events are independent of personality. The paucity of asterisks in Table 2,

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therefore, is a reminder that many statistically significant effects were small in absolute magnitude. This observation underscores the logic of using an effect size acceptability criterion rather than a significance criterion when assessing personality-event relationships in this study.

Predictors of Individual Criteria

A School Success. School success was most strongly related to mental ability (Table 2), but also was related to personality. Activity (r = .16), Emotional Stability (r = .16), and Orderliness (r = .10) predicted school success at the domain level of analysis.

FHIDs generally predicted school success better than the domain scales. Three FHIDs met the acceptability criterion even though the corresponding domain scale did not. These instances were Belief in Human Worth (r = .16) from the Trust domain, Service (r = .11) from the Empathy domain, and Tolerance for Blood (r = .10) in the Masculine domain. The Lack of Depression FHID predicted better than the corresponding Emotional Stability domain scale (r = .21 vs. r = .16). The Need to Excel FHID and the Activity domain scale produced identical correlations (r = .16). Only the Orderliness domain produced an acceptable domain correlation (r = .10) without a comparable or larger FHID correlation within the domain. Neither the domain scale nor any FHIDs met the acceptability criterion for the Extraversion and Conformity domains.

A thumbnail description of the successful student is provided by considering the strongest correlates of school success within each domain. The successful student had above average mental ability (GCT) and ambition (Need to Excel). The successful student had positive expectations about the future (Lack of Depression), believed people are worthwhile and decent (Human Worth), and was willing to engage in service to others (Service). The successful student tended generally to be orderly, but the ability to accept and tolerate a great deal of routine (Routine) and to strive to get things exactly right (Meticulousness) may have been the key underpinnings of this relationship. The ability to tolerate specific aspects of working conditions in a medical setting also appeared important to success (Tolerance for Blood). Attributes such as sociability and willingness to conform to laws and rules were not related to school success.

Complete Enlistment. Successful completion of the first-term of enlistment was related to different variables than was school success. School success was most strongly related to the Emotional Stability and Activity domains. Completing the enlistment was more strongly related to Conformity than to any other domain (r = .15). The relationships between completion and the Respect for Law (r = .13) and Intolerance for Nonconformity (r = .11) FHIDs met the acceptability criterion at the FHID level.

Comparisons to other domains illustrate the specificity of the link between Conformity and Completion of Enlistment. The next strongest domain predictor of completion (Orderliness) produced a correlation of r = .07. This value was less than half the size of the Conformity correlation (r = .15). In fact, Need for Approval (r = .07) was the weakest Conformity FHID predictor of completion. Only 5 of 35 FHIDs from other domains produced a correlation as large as this minimum (Liking for Work, r = .09; Cautiousness, r = .08; Lack of Depression, r = .08; Exercise, r = .07; Lack of Agitation, r = .07). Clearly, conformity was the key predictor domain.

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Table 2

Personality Predictors of Career Sequence Events

Scale	School Success	Track Seaman	Transfer Other	Comp Enl	Final Pay	Reen Recomm	Reen Dec
Trust	.08	.04	.02	.05	.12*	.06	.03
Belief in Human Worth	.16*	.06	.03	.03	.06	.06	.00
Lack of Defensive- ness	-.05	-.01	-.03	.01	.10*	.02	.01
Trust in Human Nature	.04	.03	.05	.06	.10*	.06	.03
Lack of Cynicism	-.01	.00	-.01	.03	.05	.01	.06
Lack of Paranoia	.08	.06	.02	.05	.09	.02	.00
Orderliness	.10*	.08	.03	.07	.04	.01	.05
Cautiousness	.07	.05	.04	.08	.01	.01	.00
Routine	.09	.09	.02	.06	.05	.01	.10*
Meticulousness	.09	.04	.00	.03	.02	.01	.04
Order	.06	.05	.02	.04	.02	.00	.02
Neatness	.02	.03	.00	.03	.03	.00	-.01
Conformity	.07	.09	-.02	.15*	.10*	.09	.06
Law Enforcement	.07	.08	.00	.13*	.13*	.09	.05
Respect for Law	.08	.10*	-.02	.09	.05	.08	.02
Acceptance of Social Order	.05	.04	.01	.08	.06	.04	.05
Need for Approval	.06	.02	-.01	.07	.04	.03	-.02
Intolerance for Nonconformity	-.05	.05	-.05	.11*	.05	.05	.10*
Activity	.16*	.07	.00	.05	.04	.01	.05
Exercise	.08	.05	.01	.07	.00	.01	.03
Liking for Work	.07	.07	-.02	.09	.13*	.05	.07
Need to Excel	.16*	.05	.03	.01	-.01	-.01	.01
Stamina	.10*	.05	-.01	.00	.02	-.01	.04
Energy	.14*	.03	.00	.01	.00	.00	.04
Emotional Stability	.16*	.06	.04	.05	.06	-.01	.02
Lack of Inferior- ity Feelings	.07	.02	-.01	-.01	-.03	-.05	.02
Lack of Pessimism	.12*	.05	.04	.01	.06	.01	.00
Mood Stability	-.06	-.02	-.02	-.05	-.05	.02	-.01
Lack of Agitation	.11*	.07	.06	.07	.04	-.01	.04
Lack of Depression	.21*	.07	.04	.08	.09	.02	.01
Extraversion	.03	-.02	.03	-.05	-.04	-.01	.04
Lack of Reserve	.02	-.03	.02	-.05	-.02	.00	.02
Lack of Shyness	-.01	-.01	.02	-.04	-.03	-.02	.03
Lack of Seclusiveness	.02	-.01	-.01	-.03	-.09	-.01	.02
No Stage Fright	.03	-.01	.04	-.03	.01	.00	.03
No Loss for Words	.03	-.01	.02	-.04	-.02	-.01	.05

(table continues)

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Table 2 (*continued*)

Personality Predictors of Career Sequence Events

Scale	School Success	Track Transfer Seaman	Track Transfer Other	Comp Enl	Final Pay	Reen Recomm	Reen Dec
Masculinity	.06	.03	.03	-.01	-.02	-.01	.02
No Fear of Bugs	.00	.02	-.01	.01	.01	.03	.05
Tolerance for Blood	.10*	.08	.02	-.02	.06	.02	.02
No Crying	.03	.03	.04	.04	-.04	-.05	.00
Tolerance of Vulgarity	.02	.01	-.01	-.04	-.06	-.02	-.03
No Romantic Love	.03	-.04	.04	-.01	.00	.00	.01
Empathy	.07	.05	-.04	.02	.02	.01	.06
Sympathy	.05	.07	-.02	.02	.03	.02	.00
Generousity	-.02	.00	-.03	-.02	-.05	-.03	.05
Helpfulness	.04	.00	-.06	.02	.02	.02	.04
Unselfishness	.06	.07	-.03	.03	.03	.01	.07
Service	.11*	.07	.00	.01	.06	.01	.07
GCT	.33*	.08	.10*	.03	.20*	.04	-.11*
AFQT	.25*	.05	.06	.06	.22*	.05	-.12*

*Correlation meets effect size criterion of r = .10 or greater.

Note. "Comp Enl" = Completed Enlistment. "Reen Recomm" = Reenlistment Recommendation. "Reen Dec" = Reenlistment Decision. See Career History in the Methods section for variable definitions and scoring.

Track Transfers. Changes to other career sequences were represented by two variables. One variable contrasted medical specialists (Rate Code of 8000 or 8300) with seamen (Rate Code of 3600). The second variable contrasted medical specialists with all other enlisted rate codes.

Personality was weakly related to pipeline changes. The contrast between medical specialists and seamen for the Respect for Law FHID (r = .10) was the only acceptable relationship. One marginally acceptable relationship in 100 examined could readily be dismissed as chance. Pipeline transfers, therefore, were not considered further.

End-of-tour Paygrade. End-of-tour paygrade involved four categories rather than the two categories typical of all other criteria. For this reason, preliminary analyses were needed to decide whether personality-paygrade relationships could be adequately represented by a linear correlational analysis. Trend analyses from the SPSS One-way procedure indicated that a linear relationship adequately represented the mean differences. Only 3 of 100 higher-order trends were statistically significant (p < .05). AFQT and GCT yielded two of the three significant higher-order trends, so only 1 of 96 trends involving personality variables was statistically significant. This frequency was well within the range

Table 3

Mental Ability and End-of-tour Paygrade

	GCT		AFQT	
	Mean	SD	Mean	SD
E-1/E-2	54.82	8.35	54.07	17.91
E-3	55.16	6.66	53.19	16.76
E-4	56.48	6.81	57.97	17.10
E-5	60.18	6.73	67.53	18.05
Total	56.84	6.97	58.68	17.72

Note. Group sizes for GCT were 45 E-1/E-2, 353 for E-3, 1,521 for E-4, and 365 for E-5. Group sizes for AFQT were 46, 356, 1,531, and 367 for those four groups, respectively.

expected by chance (binomial probability of one or more significant effects = .997). The one statistically significant deviation from linearity accounted for less than 0.25% of the overall variance.

The significant curvilinear trends for AFQT and GCT were quadratic in form. In both cases, sailors in the E-5 category had much higher ability levels than would be predicted by linear extrapolation from lower levels (Table 3). However, few people achieved the E-5 level, so the linear trend accounted for 4.6 times as much variance in GCT and 5.7 times as much variance in AFQT. Given this fact, a linear relationship was retained in subsequent analyses as a reasonable first approximation for these two predictors for present purposes.[3]

End-of-tour paygrade was modestly related to personality. Sailors who scored high on Trust (r = .12) and Conformity (r = .10) achieved higher end-of-tour paygrades. At the FHID level in these domains, a higher end-of-tour paygrade was associated with seeing others as Lack of Defensiveness (r = .10), Trust in Human Nature (r = .10), and Law Enforcement (r = .13). End-of-tour paygrade also was related to the Liking for Work FHID (r = .13) even though the Activity domain score correlation did not approach acceptability (r = .04). Thus, FHIDs provided superior prediction in two of three relevant domains.

The thumbnail sketch of the typical person who was promoted at a faster than average rate was someone who worked hard, was willing to follow rules and regulations, and may have been unusually good at teamwork. This last attribute is inferred from the fact that he adopted a cooperative attitude toward coworkers and believed them to be honest and trustworthy.

Reenlistment Recommendation. Reenlistment recommendations were not related to personality. No correlation between personality measures and reenlistment recommendations met the acceptability criterion. The Conformity domain (r = .09) and the associated FHIDs for Law Enforcement (r = .09), and Respect for Law (r = .08) came closest to satisfying the criterion. No other association was larger than r = .06.

Reenlistment Decision. No domain scale satisfied the effect size criterion (maximum r = .06), but the Routine (r = .10) and Intolerance for Nonconformity FHIDs (r = .10) did.

The generally negative findings for the reenlistment criteria led to consideration of factors that might mask associations. One possibility was that personality is an important factor only in marginal cases (e.g., individuals who are recommended for reenlistment despite limited past success). Appendix B presents the results of analyses indicating that initial success in the Navy, indicated by end-of-tour paygrade, did not influence personality-reenlistment associations.

Detailed Analysis of Enlistment Outcomes

The initial analyses contrasted sailors who completed their tour of duty with sailors who failed to do so. This simple categorization ignores the fact that sailors fail to complete their enlistments for many different reasons. Personality flaws may contribute to the events leading to attrition only in some cases (Klein et al., 1991). For example, dividing attrition into behavioral problems versus other problems (e.g., medical) helps clarify the influence of personality on attrition (Vickers & Conway, 1983). For this reason, additional analyses were performed to examine personality as a predictor of specific reasons for attrition.

Attrition Subgroups. The sample was divided into six groups to increase the detail in the analysis of attrition. The groups were:

a. Completion: Sailors who completed 3½ years or more of their enlistment and were honorably discharged or reenlisted.

b. Convenience: Sailors discharged more than six months prior to completing their obligated service for reasons that did not imply poor adaptation to the service.

c. Medical: Sailors honorably discharged more than six months prior to completing their obligated service for medical reasons.

d. Unsuitability: Sailors discharged more than six months prior to completing their obligated service for job-related behavioral problems (e.g., inaptitude, lack of motivation).

e. Personality: Sailors discharged more than six months prior to completing their obligated service with a personality disorder diagnosis.

f. Legal: Sailors discharged more than six months prior to completing their obligated service with dishonorable discharges.

The first three categories presumably included people who adapted successfully to the Navy even though they may have attrited for nonadaptive reasons. The next three categories included people who failed to adapt in the sense that they were unable to meet acceptable behavioral standards for Navy personnel. These higher-level categories are referred to as adaptive successes (ASs) and adaptive failures (AFs) in the remainder of this paper. The AS label reflected the fact that the reasons for discharge did not indicate major performance deficiencies arising from poor behavioral adaptation to the service. AFs included sailors discharged for

unsuitability, personality disorders, or illegal activities. These discharges were classified as adaptive failures because the recorded reason for discharge clearly indicated inadequate performance or other problems indicating failure to conform to military standards of behavior. Appendix C details the loss codes comprising each category.

Hypotheses. The follow-up analyses were structured to test two general hypotheses:

A. Maladaptive personality traits would be more strongly related to discharge for personality disorder than to unsuitability or legal discharges.

B. Sailors discharged for medical problems or for the convenience of the government have personality profiles comparable to the completion group.

C. The personality profile of sailors who adapt successfully to the Navy (i.e., completion, convenience, medical groups) will differ significantly from that of sailors who fail to adapt (i.e., unsuitability, personality, and legal groups).

Rationale for Hypotheses. Hypothesis A asserted that personality would be particularly relevant to predicting the personality disorder component of AF attrition. This hypothesis was based on a mixture assumption. A clinical diagnosis of personality disorder is required for a sailor to be discharged on these grounds (Bureau of Naval Personnel, 1995), so personality defects are directly implicated in all disorder discharges. Unsuitability and legal discharge groups may include people with personality disorders, but it is possible that only some people in these groups necessarily have personality flaws. If only a subset of unsuitability and legal discharges have detectable personality problems while all personality disorder discharges have such problems, the personality disorder discharge group will be more extreme on personality scales that reflect the relevant personality deficiencies.

Hypothesis B was based on prior evidence that military recruits discharged for medical reasons were more similar to successful recruits than to recruits discharged for lack of motivation, unsuitability, and other behavioral problems (Vickers & Conway, 1983). To test this hypothesis, Convenience and Medical discharges defined the general category of discharges that did not involve behavioral problems. Unsuitability, personality, and legal discharges were based on behavioral problems.

Hypothesis C was based on the idea that previously cited meta-analyses have documented general personality-performance relationships. Those documented relationships include general outcomes (e.g., turnover, organizational delinquency) summarized by the AS/AF distinction (cf., p. 17) in the present study. Tests of this hypothesis, therefore, related personality to the AS/AF dichotomy.

Analysis Procedures. Hypotheses were tested using all (N = 4,512) participants in the basic study sample (see Sample section of Methods). This deviation from the general use of the career sequence approach was justifiable because attrition seemed likely to be a function of the person, not the job. In other words, the basic psychological dynamics leading to unsuitability, personality disorder, or legal discharges were assumed to

be generally similar regardless of whether the person was in the corpsman career track. In the absence of reasons to believe that specific personality attributes were related to legal problems (for example) among corpsmen, but not other sailors, utilizing all data from the basic sample provided larger sample sizes for estimating relationships.

MANOVAs contrasting all six groups were performed to test the hypothesis that personality profiles differed between the groups. Ten MANOVAs were performed, one for the domain scales, eight for the FHIDs within each domain, and one for mental ability. The MANOVAs could indicate that group differences were present, but these procedures did not specify which particular groups differed.

Follow-up analyses employed planned contrasts to test specific hypotheses about which groups differed. These follow-up analyses included all personality variables that produced univariate effect sizes (etas) of .10 or greater in the initial MANOVA (Table 4). The effect size screen was imposed because no single degree of freedom could satisfy effect size criterion when all 5 degrees of freedom accounted for less than 1% of the variance in the initial analysis.

Hypothesis A: Differences Among AF Categories. There was little support for Hypothesis A. Only 5 of 38 contrasts (2 comparisons for each of 19 personality variables) were statistically significant ($p < .05$). This frequency would be expected by chance ($p = .573$). Considering each contrast separately, Unsuitability clearly produced statistically significant differences with chance frequency (2 of 19 significant, $p = .208$). Legal problems produced a marginally significant frequency (3 of 19 significant, $p = .050$), but even this marginal frequency would be considered chance if all 48 personality measures used in the study were considered as the frame of reference.

These analyses involved a relatively small subset of the overall sample. Despite this fact, the absence of differences cannot be attributed to lack of statistical power. With a sample of 800, the probability of rejecting the null hypothesis is 88% if the true effect size is $r = .10$ or larger (Cohen, 1969). This expected rate substantially exceeds the observed rate of 13%, so it is reasonable to infer that few of the true effect sizes were as large as .10.

Hypothesis B: Differences Among AS Categories. The initial test of Hypothesis A contrasted Convenience and Medical discharges with the Completion group. The hypothesis would be supported if these contrasts produced small differences. Two dichotomous variables were constructed. The first dichotomy compared the Completion group with the Convenience group. The second dichotomy compared the Completion group with the Medical group. The use of two criterion dichotomies increased the risk of capitalizing on chance because more than one test for acceptability was conducted. That risk was offset by the decreased risk of overlooking important differences if Medical and Convenience discharges were affected by different elements of personality.

The analyses supported the assumption that the Completion, Medical, and Convenience groups had comparable personality profiles. None of the 38 comparisons(2 contrasts for each of 19 significant first stage predictors) produced a point biserial correlation greater than $r = .08$. Thus, none met the acceptability criterion.[4]

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Table 4

Personality Predictors of Reasons for Attrition

Scale	Over-all[a]	Comp vs. Con	Comp vs. Med	AS vs. AF	PD vs. Unsuit	PD vs. Legal
Trust	.10*	.00	.02	.09	.06	.04
Belief in Human Worth	.13*	-.01	.01	.12*	.09	.07
Lack of Defensive- ness	.10*	.01	.04	.10*	-.01	.00
Orderliness	.11*	.03	.07	.10*	-.02	-.04
Cautiousness	.10*	.03	.03	.08	.07	.07
Routine	.12*	.03	.06	.10*	-.08	-.07
Conformity	.19*	.06	.07	.17*	-.03	-.02
Law Enforcement	.16*	.05	.08	.14*	-.05	.02
Respect for Law	.14*	.04	.05	.13*	.03	.01
Acceptance of Social Order	.10*	.01	.05	.10*	-.03	.00
Need for Approval	.11*	.03	.01	.11*	-.01	-.02
Activity	.13*	.03	.04	.12*	.03	-.05
Exercise	.11*	.00	.03	.10*	.03	-.07
Liking for Work	.13*	.03	.07	.11*	.05	-.03
Emotional Stability	.12*	.04	.03	.12*	.00	-.05
Lack of Agitation	.12*	.04	.04	.10*	-.01	-.09
Lack of Depression	.16*	.03	.04	.15*	-.01	-.01
Empathy Service	.11*	.00	-.01	.10*	.08	.02
GCT	.19*	-.03	.00	.17*	.13*	.12*
AFQT	.14*	-.03	.01	.13*	.12*	.11*

[a]Eta is the ANOVA equivalent of a multiple regression coefficient and reflects the total variance explained by the group differences. The remaining columns indicate point biserial correlations representing a single parameter value (i.e., magnitude of the difference between two groups) and have been given signs to indicate the direction of difference.

*Effect being tested meets effect size criterion of 1% or more of variance explained. The specific contrasts in columns 2 through 5 were not tested if the overall ANOVA failed to meet the criterion. An overall effect of eta = .05 or greater was statistically significant (p < .05).

Note. "Comp" = Completed obligated service; "Con" = Early discharge for convenience of government; "Med" = Early discharge for medical problems; "AS" = Adaptation success; "AF" = Adaptation failure; "PD" = Personality disorder; "Unsuit" = Unsuitability. See text for definition of the contrasts examined.

Hypothesis C: Differences Between AS and AF Sailors. The AS/AF dichotomy was defined in the belief that the behaviors comprising the AF category were logically linked to personality variables. These behaviors approximate the conceptualization of organizational delinquency that has been particularly strongly related to personality variables in prior research (Kamp & Hough, 1986).

The AS/AF distinction should not be equated with job performance. Poor performance can be one manifestation of maladaptation (e.g., inaptitude discharges imply poor performance), but AF classification does not absolutely require poor performance. A person could encounter off-the-job problems that led to civil convictions without necessarily performing poorly on the job. Also, AS classification does not guarantee good performance. A physical condition could make it impossible to fulfill job responsibilities, but still leave the person in the AS. The key to the AS/AF distinction, therefore, is not performance per se. The distinction rests on whether the person is able to comply with standards for acceptable behavior established by the service and/or civilian society.

The point biserial correlations between personality measures and the AS/AF dichotomy supported Hypothesis C. Sixteen of eighteen personality variables and both mental ability measures that produced etas of .10 or larger in the attrition MANOVA produced correlations of r = .10 or greater with the AS/AF criterion. Only the Trust domain scale (r = .09) and Risk Avoidance FHID (r = .08) failed to meet the effect size criterion. Even these two "failures" were close to the criterion and well above accepted criteria for a nonchance relationship (z > 5.59 for each).

Sufficiency of an AS/AF Model. The AS/AF distinction identified groups of sailors with distinctive personality profiles in the preceding analyses. The other contrasts examined were relatively minor sources of differences in personality, but those other contrasts did not investigate all possible ways of grouping people. Additional searches would not be productive because those searches could not possibly yield any additional contrasts meeting the basic acceptability criterion for this study. This conclusion results from subtracting the personality score variance accounted for by the AS/AF difference from the total variance accounted for by differences among all 6 attrition groups (i.e., by subtracting the squared value of the fourth column of Table 4 from the squared value of the first column). None of the differences was larger than 0.7%, so no possible contrast could account for 1% of the variance after controlling for the AS/AF difference. The 1% criterion corresponds to the acceptability criterion used in this study, so no other possible contrast could have met the acceptability criterion. The AS/AF distinction, therefore, was sufficient to summarize the overall differences between the attrition groups.

Bandwidth-Fidelity Trade-off. The pattern of AS/AF personality correlates of AS/AF criterion also supported the position that personality facets were better predictors than were domain constructs. Although associations meeting the effect size criterion were more likely at the domain level (5 of 8, 62.5%) than at the FHID level (13 of 40, 32.5%), the FHID level provided more precise prediction. Four domains (Trust, Orderliness, Emotional Stability, and Empathy) included at least one FHID with a larger effect size than the corresponding domain scale. In addition, the effect size for the Activity domain equaled the effect size for the Effort FHID. Only the Conformity domain scale was superior to all

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its component FHIDs (eta = .19 vs. eta = .16 or less). Thus, FHIDs were somewhat better predictors in four domains, equal in one domain, and poorer in only one domain. The Extraversion and Masculinity domains did not provide any predictors that met the acceptability criterion.

Mental Ability. Unlike personality, mental ability did discriminate among the AF groups (Table 4). The personality disorder group was more intelligent than the unsuitability and legal groups. All four mental ability contrasts exceeded the effect size criterion.

Summary of Detailed Attrition Analyses. The AS/AF distinction was critical to understanding personality-attrition associations. Personality differences between subcategories within the AS and AF categories were small and could be attributed to chance. Mental ability produced a similar picture, except that the personality disorder discharges had higher measured intelligence than the legal or suitability discharges.

Personality Combined With Mental Ability

The fact that personality and mental ability both predicted at least some career events raised several questions about the possible utility of employing measures from both domains as combined criteria for forecasting career success. Does the consideration of personality actually improve predictions of success over those provided by mental ability measures? Do personality strengths compensate for mental ability weaknesses and vice versa? These questions are considered in the following section of the paper.

Incremental Validity of Personality. The preceding analyses indicated that some personality variables predicted each career event up to reenlistment. Mental ability produced somewhat stronger predictions of the same events. Furthermore, mental ability measures currently are used in selection decisions. If personality is related to mental ability, personality-career event correlations may be spurious. Personality may predict success only because personality correlates with a true cause of differences in success (i.e., mental ability). Thus, it was important to ask whether personality had incremental validity, that is, whether personality predicted career events controlling for mental ability.

Spurious effects would be most likely if personality and mental ability were highly correlated. The observed personality-mental ability correlations were small. The largest personality-GCT correlation was r = .236, and 56.3% (27 of 48) personality-GCT correlations were r < .10. The corresponding figures for AFQT were r = .166 and 81.3%.

Table 5 presents partial correlations between personality and career events controlling for mental ability. This analysis was carried out to determine the relationships between personality and career events controlling for mental ability. Separate analyses were performed with GCT and AFQT as the ability indicator. Both ability measures produced comparable patterns of findings, but controlling for GCT produced slightly smaller partial correlations on the average. Results for GCT, therefore, are considered here as the more stringent test for the effects of personality-mental ability correlations on personality-event relationships.

A substantial proportion (68%; 23 of 34) of the personality-career event correlations that met the criterion in the initial analyses also did

Table 5

<u>Correlations Between Personality and Career Events</u>

<u>Controlling for General Classification Test (GCT) Scores</u>

Scale	Adjustment	School Success	End-of-Tour Paygrade
Trust			
Belief in Human Worth		.10	
Orderliness	.12	.14	
Cautiousness	.11	.13	
Routine	.11	.12	
Conformity	.18		.12
Law Enforcement	.13		.12
Respect for Law	.14		
Acceptance of Social Order	.10		
Need for Approval	.12		
Tolerance for Nonconformity	.10		
Activity	.10	.12	
Liking for Work			.11
Need to Excel		.13	
Energy		.11	
Emotional Stability		.11	
Lack of Depression	.11	.15	

<u>Note.</u> Only those partial correlations satisfying the effect size criterion for r > .09 have been tabled. FHID scales are indented.

so in the partial correlation analyses. Given the weakness of the personality-mental ability relationships, the fact that any correlations were reduced to nonacceptability may appear surprising. However, it must be remembered that many of the original relationships just met the acceptability criterion. Any reduction in variance explained for these variables dropped them below the criterion value.

    <u>Personality-Ability Interactions</u>. Interactions between personality and ability provide a more complex approach to incremental validity. Interactions arise when the relationship between a predictor variable and a criterion depends on the level of some third variable. In the present case, for example, intelligence might mask character flaws. An intelligent person may express antisocial tendencies more subtly than overt nonconformity. Conversely, character strengths may overcome ability limitations. A person of less than average intelligence still may master course work by exceptional diligence and effort. In both cases, the personality-career event relationships would depend on the level of intelligence.

Contingent relationships of the types previously described are represented by interaction terms in statistical models. The presence of such interactions was tested for in the present study by a set of MANOVAs. Personality measures were the dependent variables and career event and mental category was the group classification variable. The "Category I" to "Category IV" classification used by the Department of Defense defined the mental ability categories. This classification was computed by recoding GCT scores (I = 71-77; II = 58-70; III Upper = 50-57; III Lower = 44-49; IV = 22-43). The number of study participants classified in each category was 360, 1,625, 1,451, 1,053, and 23 for Category I through Category IV, respectively. This mental ability classification was used in the present analyses to link the analysis results directly to military classification and selection practices. The analyses paired mental category with the career events of school success, AS/AF, end-of-tour paygrade, reenlistment recommendation, and reenlistment.

Interactions were unimportant. One reason for this assertion is that statistically significant interactions occurred with chance frequency. School success (4 multivariate, 5 univariate), AS/AF (1 multivariate, 4 univariate), and reenlistment (0 multivariate, 3 univariate) produced the only statistically significant interactions. The rate of statistically significant effects could be attributed to chance for both multivariate effects (5 of 45, p = .073) and univariate effects (12 of 240, p = .5413).

Another reason for regarding interactions as unimportant was that even statistically significant interactions did little to improve the accuracy of prediction. No univariate interaction accounted for more than 0.7% of the variance in the relevant personality scale scores. An effect size that small would not be acceptable even if the interactions involved only one degree of freedom, rather than the four degrees of freedom actually involved in each interaction test.

Multivariate Predictive Models.

Evidence that personality had incremental validity for predicting career event criteria set the stage for the development of multivariate predictive models combining mental ability and personality. Logistic regression models (Aldrich & Nelson, 1984) were developed for the school success, adjustment, and end-of-tour paygrade in a three-step process:

Step 1--Split-Sample Predictor Selection: Predictive equations were developed using stepwise forward predictor selection. The set of predictors included GCT and those personality variables with significant relationships in Table 5. Separate analyses were conducted for the domain and facet levels of analysis.

The entry criterion was p < .05, but the removal criterion was p < .001. Thus, predictors were added to the equation if they improved prediction even slightly, but weak predictors were dropped later. This approach identified "intermediate" variables that met statistical criteria but contributed little to criterion prediction.

The sample was split in half by sequence number. Cases were numbered from 1 to 4,512 based on their order within the data file. Odd-numbered cases were assigned to one subsample, even-numbered cases to the other subsample. Separate analyses were performed in each subsample to test the within-population replicability of the

predictive equations.

Step 2--Replication of Regression Weights: Step 1 produced equations with the same predictors, but different regression weights in the two subsamples. Step 2 recombined the subgroups into a single sample and used a subgroup interaction term to test for the significance of the differences in regression weights. No interaction was statistically significant (all p > .080). Given the large sample sizes, these tests for interactions should have good statistical power. Thus, it was reasonable to conclude that a single regression equation was applicable to the general population.

Step 3--Full Sample Regression Equations: The final analysis phase determined logistic regression weights for the predictors using data from the full sample. The logistic regression analysis was repeated using the set of predictors selected in Step 1 for the full sample.

Predictive equations were developed for school success, the AS/AF criterion, and end-of-tour paygrade. Reenlistment criteria were excluded from the analyses because previous analyses had failed to identify any significant personality predictors for those criteria. End-of-tour paygrade was dichotomized to indicate slower than average advancement (i.e., E-3 or less) or average to above average advancement (i.e., E-4 or above) during the first-term enlistment. The analysis required this recoding because logistic regression can only be performed with dichotomous variables.

Results. Results replicated well across subsamples. Step 1 produced predictive equations with the same set of predictors for both subsamples except for the FHID predictors of adjustment. In that case, relaxing the removal criterion in the backward stepwise portion of the analysis from p < .001 to p < .03 produced the same equation in both samples. With the removal criterion modified for the FHID equation for adjustment, the analyses produced the results summarized in Table 6.

School Success. The domain equation included GCT and Orderliness. Students with higher GCT scores and higher Orderliness scores were more likely to graduate. The equation correctly predicted success/failure for 72.0% of all students. This figure was a 3.3% improvement over the 68.7% accuracy that would have resulted if all students were predicted to graduate. The proportional reduction in predictive error relative to this null model,[5] therefore, was .105.

The FHID equation included GCT, Lack of Depression, and Cautiousness. Students with higher GCT scores, higher Lack of Depression (i.e., greater hope for the future), and higher Cautiousness scores were more likely to graduate. The equation correctly predicted success/failure for 72.2% of the students, a 3.5% improvement over the accuracy of the null model. The proportional reduction in predictive error therefore was .112.

Adjustment. The domain equation included GCT and Conformity as predictors. A sailor was more likely to successfully complete his first-term enlistment if he had a higher GCT score and if he had a high Conformity score. The equation correctly predicted attrition status for 76.8% of the sample, an increment of 0.1% over the accuracy of the null model. The proportional reduction in error was .004.

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Table 6

Logistic Regression Equations for School Success,

Adjustment, and End-of-Tour Paygrade

Criterion	Predictor	Regression Weight	SD
School Success			
Domain	GCT	.1104	.0054
	Orderliness	.0237	.0026
	Constant	-7.3790	.4090
FHID	GCT	.1030	.0055
	Cautiousness	.0630	.0093
	Lack of Depression	.0719	.0087
	Constant	-7.4244	.3848
Adjustment			
Domain	GCT	.0552	.0051
	Conformity	.0310	.0027
	Constant	-4.5217	.3860
FHID	GCT	.0481	.0055
	Cautiousness	.0454	.0101
	Respect for Laws	.0561	.0095
	Need for Approval	.0429	.0086
	Lack of Depression	.0459	.0095
	Constant	-4.9300	.4148
End-of-Tour Paygrade			
Domain	GCT	.0508	.0083
	Conformity	.0197	.0041
	Constant	-3.8071	.6231
FHID	GCT	.0418	.0083
	Respect for Law	.0456	.0142
	Liking for Work	.0466	.0145
	Constant	-2.3739	.5335

Note. Equations yield probability of succes in A school for School Success, probability of completing the first-term enlistment for Adjustment, and probability of average or faster than average promotion for End-of-Tour Paygrade. All regression coefficients were statistically significant ($p < .01$).

The FHID level included GCT, Cautiousness, Respect for Laws, Need for Approval, and Lack of Depression. Higher scores on each predictor were associated with a greater probability of successfully completing the first enlistment. The 77.6% predictive accuracy of the equation represented a proportional reduction in error of 2.2% relative to the null model.[6]

End-of-Tour Paygrade. The domain equation included GCT and Conformity. An average or above average rate of promotion was more likely if the person had a high GCT score and if he had a high Conformity score.

However, the predictive value of the equation was modest because the proportion of correct predictions (82.5%) was equal to that obtained with the null model.[7]

The FHID level equation included GCT, Respect for Law, and Liking for Work. Higher scores on each predictor were associated with a greater probability of having an average or above average paygrade.

Discussion

Four broad trends characterized the relationships between personality and first-term enlistment career events reported in this paper. First, personality predicted early events in the first-term enlistment, but not later events. Second, facets predicted events better than broad personality dimensions, thereby supporting the bandwidth-fidelity trade-off. Third, personality effects on career events did not generalize across criteria. Fourth, personality had incremental validity controlling for mental ability. The bases for these inferences and their significance are considered in the remainder of this discussion.

The tendency for personality-event relationships to weaken as the enlistment progressed could be explained several ways. Perhaps personality is not a relevant factor in reenlistment recommendations and reenlistment decisions. Alternatively, personality changes occurring during the first-term enlistment may make personality assessments taken several years earlier poor indicators of personality at the time the decision is made. Substantial personality change is common in the 18- to 30-years age range (Scheurger, Zarella, & Hotz, 1989). Measures taken on entry into the service, therefore, may be imprecise indicators of personality at the time of the evaluations that form part of the promotion and reenlistment decision processes. A third possibility is that whatever facets are relevant to reenlistment were not covered in the present set of personality measures. Finally, reenlistment recommendations and decisions may be the product of the person's cumulative behavior and experiences in the Navy. If so, personality effects may be present because key elements of those experiences have been influenced by personality factors. However, the effects would be indirect because the influence on reenlistment would depend on intervening events. This interpretation is consistent with the evidence that personality has some effects on promotion and that promotion, in turn, is related to probability of reenlistment.

The inference that personality facets provide the appropriate level of analysis for predicting Navy career events is based on the relative predictive strength of the domain and facet level scales. Success in A school, adjustment to the Navy, and end-of-tour paygrade were related to one or more personality measures. Acceptable predictors were found in five different domains for A school success, in six different domains for adjustment, and in three different domains for end-of-tour paygrade. In 10 of the 14 cases where a domain produced one or more significant predictors for these three criteria, the strongest association was obtained for a facet scale. This trend would have been more pronounced if the facet level scales had been measured with higher precision. The facet scales had low internal consistency estimates of reliability compared with the domain scales. When the correlations were corrected for attenuation due to measurement error (cf., Lord & Novick, 1968), the data supported the facet level of analysis even more strongly than was observed in the raw correlations (Appendix D). Estimated population correlations of $r = .10$

or greater were noted in seven of eight domains for A school success, in five of eight domains for end-of-tour paygrade, and in seven of eight domains for adjustment to the Navy. In 18 cases, at least one facet level scale had an estimated population correlation greater than the domain scale. In the nineteenth case, one facet level scale produced a correlation equal to that of the domain scale. The practical inference is clear. The best criterion prediction will be provided by increasing the measurement precision of the facet scales. Note, however, that every domain of the CPS provided a potentially useful predictor of one or more criteria and that five of eight domains produced a predictor in the final multivariate equations (cf., Table 6). These observations underscore the importance of using the five-factor model or some other systematic set of higher-order personality factors to guide the sampling of specific personality facets. At the same time, the results echo Mershon and Gorsuch's (1988) finding that five general factors provide a suboptimal level of analysis for predicting job-related criteria.

The observation that personality effects did not generalize across criteria provides further support for the bandwidth-fidelity hypothesis. Predictive equations were specific to each criterion. No facet predicted more than two of the three criteria in the final multivariate predictive equations (cf., Table 6). Further, no two criteria had the same set of predictors. The overall pattern defines a situation in which a specific set of facet level predictors must be identified to optimize the prediction of each criterion. This result is the essence of the bandwidth-fidelity principle and is a reminder that the bandwidth concept applies to both sides of the predictive equation.

The assertion that personality has incremental predictive validity refers to the results obtained controlling for general mental ability. Mental ability is used in current screening and selection procedures. Personality has incremental validity if personality measures improve the prediction of career events after taking mental ability differences into account. The partial correlation analysis (cf., Table 5) and the logistic regression analyses (cf., Table 6) demonstrated that personality met this requirement. Note, also, that the reverse is true. Mental ability has incremental validity for predicting criteria controlling for personality. In combination, these observations should help guard against over-simplification by cautioning against regarding any criterion as solely an expression of mental ability or of personality.

The trends relating personality to career events reported in this paper suggest several guidelines for personality screening in military populations. First, personality should be assessed by properly chosen personality facets, not by measures of general personality domains or dimensions. Second, "properly chosen" facets will be those relevant to the specific criterion or criteria of concern. Third, screening guidelines should include mental ability as well as personality.

The first two guidelines raise questions about the utility of most prior personality-performance research. The "specificity" guidelines are a direct consequence of confirming the bandwidth-fidelity principle. Specificity implies that successful forecasting of career success will require careful analysis of both sides of any personality-career event equation. Most past research has relied on general criteria (e.g., overall attrition), general personality dimensions (e.g., McHenry, Hough, Toquam, Hanson & Ashworth, 1990; Trent & Laurence, 1993), or more specific measures

chosen for relevance to a broad criterion, such as susceptibility to stress (e.g., Vickers & Conway, 1983). The resulting information provides a broad basis for inferring that personality predicts success, but it does not provide the detailed personality profiles required for accurate forecasting.

One further point merits attention. The bandwidth-fidelity principle was useful for understanding the findings, but there appears to be little value to the vocational interest approach to predicting success. This model phrases predictions in terms of general dimensions, not specific facets. Also, the vocational interest model focuses on how well a person can be expected to like a given job and, perhaps, how well he/she will perform critical elements of that job (e.g., being extraverted may be important to performing the interpersonal components of a medical job). The vocational interest model does not focus on other relevant questions. Does the person possess the characteristics required to succeed in getting the education required for entry into the job? Is the person sufficiently well-adjusted to stay on the job once trained? Ultimately, the most useful approach to understanding vocational success, as opposed to vocational interest, may be to adopt a career path approach and analyze key performance requirements within that path to determine the person's likelihood of success. In such a model, the key element of vocational interest may be concepts such as burnout or job satisfaction, i.e., reactions to performing the job that lead to poor performance or seeking a different occupation. In the long run, vocational interest assessments may be important primarily as they relate to counseling individuals as one element of selection and assignment programs that must make decisions with the interests of both the individual and the organization in mind.

The preceding inferences and suggestions should be viewed in light of possible limitations of the evidence. This study covered a single military occupational specialty and addressed only males entering that specialty. The men who provided data entered the service during the unique sociopolitical era of the Vietnam War. The sociopolitical unrest in society during that period may have affected how people's personality was expressed in specific behaviors as members of a military organization. Personality assessment was limited to the facets assessed in a single standardized instrument. Any or all of these factors could affect the strength and pattern of observed associations. Meta-analyses (e.g., Barrick & Mount, 1991; Kamp & Hough, 1986; Tett et al., 1994) suggest that the findings will generalize qualitatively, but the key issues raised by the present study are more specific in character. Will the same facets predict the same criteria in other samples? Will the incremental validity of the facets replicate in other samples? Some evidence for replicability of the findings was provided in the split-half analyses in the present paper, but these generalizability issues remain to be addressed. Assuming the present results generalize, the practical implications pointed out in this discussion of the results provide guidelines for developing optimal personality screening procedures for Navy applications.

Footnotes

[1]The facet designation was chosen in preference to FHID or HIC because the latter terms refer not only to a level in the personality hierarchy, but also to the statistical method used to construct the specific scale. The term "facet" has been used by Costa and McCrae (1992) to refer to the conceptual distinction between general domains and specific theoretical constructs within the domains. This usage seemed more appropriate for the general purpose of labeling a level of hierarchy even though the measures representing that level in the present study were FHIDs.

[2]The adopted terminology is not expected to be entirely effective. Some authors use the terminology of "accepting" statistically significant findings. This terminology contrasts with "rejecting" findings consistent with the null hypothesis. While this practice yields some risk of confusion when a result is termed "acceptable," references to acceptability are much less common in practice than are references to significance. Thus, the chosen phrasing seemed likely to be the more useful of two imperfect alternatives, because readers were expected to be less in the habit of interpreting it in significance testing terms.

[3]The qualifier " . . . for the present purposes" is important. The higher-order trend could be very important whenever the objective was to identify the truly exceptional performer. This group might be the focal point for programs involving enlistment bonuses or other incentives.

[4]It would be wrong to conclude that the associations in question were literally equal to zero for both Medical and Convenience attrition. Eleven of eighteen point biserial correlations between the Completion-Medical dichotomy and personality were greater than would be expected by chance. Using the full set of 50 measures as the frame of reference for evaluating this frequency of significant findings, the probability of obtaining this many statistically significant deviations from $r_{pb} = 0$ would be $p < .00003$. However, only four point biserial correlations were significant for the Completion-Convenience dichotomy. This frequency could readily occur by chance ($p < .240$). Overall, the most reasonable conclusion is that the contrasts between Completion and Medical differ slightly from zero, but the differences are too small to be of practical or theoretical significance (Cohen, 1969). The contrasts between Completion and Convenience can be regarded as equal to zero except for sampling error. Thus, personality may weakly influence Medical discharges, but the effects are too small to be of further concern.

[5]Proportional reduction in error (PRE) was computed as

$$PRE = (EP_n - EP_a)/EP_n$$

where "EP_n" is the number of erroneous predictions under the null model and "EP_a" is the number of erroneous predictions under the alternative model. The null model in the present analyses was the prediction that all sailors would be successful. The alternative model was provided by the logistic regression predictions. PRE is a cross-classification analysis equivalent of R^2 in parametric analyses. See Hilderbrand, Laing, and Rosenthal (1977) for a general description of the PRE approach to prediction in cross-classifications.

[6]Computations for incremental predictive values began from slightly different base rates of attrition. Individuals who were missing scores for

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one or more predictors in a given analysis were excluded from that analysis. Individuals who were excluded from one analysis based on missing data could be included in other analyses provided they had complete data on the predictor set used in that analysis. Thus, the sample of participants actually included in the analyses varied somewhat from one set of predictors to another. As a consequence, the overall attrition rate for those individuals used in the analysis of a given set of predictor variables could differ from that for individuals used in the analysis of other predictor sets.

[7]The finding that significant correlates of a criterion do not predict the status of individual cases may appear logically inconsistent. The apparent inconsistency can be understood by making a distinction between aggregate predictions and point predictions. Aggregate predictions group people based on their scores on the predictor variable(s). The analysis then focuses on whether the groups of people differ on the criterion variable. A significant relationship between the predictor and the criterion is identified if high-scoring groups have much higher or lower rates of occurrence than low-scoring groups. At this level of analysis, a significant result will be obtained if groups defined by scale scores on the predictor show a pattern of systematically increasing or decreasing probabilities for the criterion variable. For example, the probability of early attrition might be relatively high for people who were in the lowest scoring group on Emotional Stability, then decrease systematically from there to a relatively low probability of attrition for the highest scoring group. If the probabilities differ sufficiently between groups, the overall relationship between probability of attrition and Emotional Stability would be statistically significant.

Predictions for individual cases are not determined solely by the presence of group differences in the probability of a particular outcome. In fact, group differences do not figure in the prediction for a given individual. That prediction depends on two considerations, the base rate for the criterion and the conditional probability of the criterion for his score level of the predictor. Base rate is the rate of occurrence of the target state in the population at large. The base rate can be used to define an odds ratio. For example, if the base rate of attrition were 25%, the odds would be 3:1 that a person randomly chosen from the incoming trainee population would not attrite. If the base rate were 33%, the odds against attrition would be 2:1.

The conditional probability for a criterion is the probability that the outcome of interest will occur in a group of people defined by the fact that they all have a particular score on the predictor variable. Logistic regression provides a method of estimating the probability of an outcome based on the score. The predictive model, therefore, provides an estimate of the probability of attrition for each individual in the sample based on his score. People with the same score have the same predicted probability of attrition, and people with different scores have different predicted probabilities of attrition. The predicted probability of attrition is the conditional probability for the criterion.

The predicted outcome for a given case depends on the combination of base rate and conditional probability. This prediction depends on the product of the base rate odds and the conditional probability odds. Suppose, for example, that the base rate is 33%, so the odds of graduating are 2:1 in favor of graduating. The base rate can be offset only if the conditional

probability is more than 2:1 that the person will attrite. Thus, it is the product of the base rate odds and the conditional probability odds that determines the prediction of individual case status. It can be shown mathematically that this procedures leads to the highest frequency of correct predictions for the sample as a whole. Another way of looking at the problem is that the base rate gives all individuals a starting point that says they are likely to graduate. The prediction changes only when their psychological profile subtracts enough from this starting point to shift the balance to a negative outcome.

The key to the difference between a significant association and predictive accuracy, then, lies in the difference between two questions. Does the conditional probability of the outcome change as scores on the predictor increase? Is the conditional probability for one or more groups high enough to offset the base rate effect and predict that people in the group will attrite? The answer to the first can be "yes" without necessarily providing a positive response to the second question. For example, suppose the base rate of attrition were 33% attrition and that a predictor produced conditional probabilities ranging from 34% to 66%. The 28% difference in predicted conditional probabilities would imply a significant overall relationship, but the odds against attrition in any given group would not be sufficient to offset the base rate odds.

[8]A table with the raw and adjusted correlations is available from the authors on request.

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Appendix A

Tests for Replicability of Relationships Between Career
Events and Personality and Ability

The first phase of the analysis evaluated the robustness of the basic empirical relationships. The sample was split in half randomly to define subsamples A and B. ANOVAs then were performed with a career sequence variable and subsample as the classification variables. For example, one analysis involved groups defined by combinations of A school outcome (graduate vs. nongraduate) and subsample (A vs. B). The personality variables and mental ability variables were the dependent measures. The primary focus of the analysis was the interaction between the career sequence variable and the subsample. The significance of the interaction provided a statistical test of the hypothesis that personality had a replicable relationship to the career sequence variable across two large randomly defined samples from the population of interest.

The analyses were conducted as MANOVAs for 10 sets of variables. One set consisted of the 8 higher-order dimensions of the CPS. Eight sets consisted of five FHIDs comprising one of the higher-order dimensions. The final set consisted of GCT and AFQT.

Each set of variables was examined for the 6 career sequence variables defined in the Methods section. The MANOVAs therefore provided 60 tests of sequence by subsample interaction tests (6 career variables x 10 personality variable sets). Only 4 significant ($.048 < \underline{p} < .010$) interactions were noted. The binomial probability of obtaining 4 or more significant ($\underline{p} < .05$) results in 60 tests is $\underline{p} = .35$. Thus, too few significant MANOVA interactions were obtained to make chance deviations a low probability explanation of the findings. Note also that none of the interaction effects was likely to be very large in absolute size. The smallest total sample size in the analyses was 2,232 individuals. With this many data points, even results achieving the $\underline{p} < .01$ significance level imply a small effect size (Rosenthal & Rubin, 1979, 1982).

Procedures involving multiple degrees of freedom risk masking potentially important effects. This risk arises because effects that truly differ from zero can be averaged with a number of effects which are zero or so close to zero that they are statistically and practically unimportant. Exploration of univariate results from the analyses provided a check on this possibility. Only 16 of 300 univariate interactions were significant. The cumulative binomial probability for 16 or more significant effects is $\underline{p} = .43$. In addition, the main effect that would have been modified by the interaction was statistically nonsignificant in 10 of those 16 cases. Thus, only 6 of 300 main effects were both statistically significant and variable across the two subsamples.

The foregoing findings support the conclusion that relationships between career pipeline status and individual differences are replicable across random subsamples from the population under investigation. Some variations in associations were observed, but they were infrequent. The low frequency cannot be attributed to weak power of the tests for differences because the sample sizes were substantial in all comparisons.

These findings indicated that findings obtained in the whole sample would replicate in subsamples except for chance variations. Given that

large sample sizes produce precise estimates of parameter values, this result was expected. However, verification of the expectation ensured that reporting simple bivariate relationships was a suitable, accurate summary of the data.

Appendix B

Paygrade Effects on Reenlistment

Personality effects on reenlistment might have been contingent on the
success a sailor experiences during his first-term enlistment. Taking end-
of-tour paygrade as a measure of success, corpsmen who made faster progress
through the ranks were more likely to be recommended for reenlistment
(Table 5). Only 32.6% of the corpsmen with an end-of-tour paygrade of E-1
or E-2 were recommended for reenlistment compared to 99.5% of those who
were E-5s. Past success also was related to probability of reenlistment
with 32.6% of recommended E-5s actually reenlisting compared to 27.6% for
E-4s and 13.5% for E-3s.

Table B-1

<u>End-of-Tour Paygrade and Reenlistment Decisions</u>

End-of-Tour Paygrade	Not Recommended	Recommended	Reenlisted	Percentage Recommended	Percentage Reenlisted
E1	13	2	0	13.3	0.0
E2	22	15	1	42.1	6.3
E3	53	283	44	86.1	13.5
E4	55	1091	416	96.5	27.6
E5	2	254	123	99.5	32.6
Total	145	1645	584	93.9	26.2

<u>Note.</u> Only those participants who completed their first enlistment and
remained in the corpsman rate code of 3600 until separation from the Navy
or reenlistment ($\underline{n}$ = 2,374) were in the table. Only men recommended for
reenlistment were included in the computation of "Percentage Reenlisted."

Personality might affect reenlistment decisions only in atypical
cases. For example, some E-3s were recommended for reenlistment despite
limited first-term success. Perhaps these individuals were exceptionally
diligent or agreeable or possessed some other attribute(s) that influenced
the recommendations. Similarly, only a minority of E-5s chose to reenlist
despite their past success. Perhaps these individuals possessed some
combination(s) of personality attributes that make(s) the Navy corpsman job
especially attractive to them. In either case, identifying relevant
personality attributes would help understand the reenlistment process.

Two-way MANOVAs tested for paygrade-contingent personality effects
on reenlistment. Two series of MANOVAs were performed with paygrade and
reenlistment status as the classification variables. One series used
recommended/not recommended as the reenlistment variable. The other series
used reenlisted/not reenlisted as the reenlistment variable. If
personality was a factor in the exceptional groups, but not in other
instances, the result would be a significant interaction.

The two analyses provided 20 tests for multivariate interactions.
Only 1 of the 20 multivariate interactions was significant ($\underline{p}$ < .05). The

probability of obtaining one or more significant results in a set of 20 tests is $p = .642$ even when all of the true values are equal to zero. This result, therefore, could readily have occurred by chance. The 100 univariate tests yielded 2 significant interactions, again a value well within the range expected by chance, ($p = .963$).

Appendix C

Reasons for Separation From Navy Service
as Determined From Loss Codes

<u>Reason for Separation</u>   <u>n</u>

Completion

    General Demobilization   1
    Early Separation Under Authorized Program   107
    End Active Obligated Service   2026
    End Term Enlistment   564
    Immediate Enlistment/Re-enlistment   89
    Appointment to Officer Status   2

Convenience
    Entry Level Performance/Conduct   4
    Action Taken by Authority Chief of Naval Personnel   5
    Alien   1
    Conscientious Objector   5
    Constructive Enlistment   19
    Dependency   6
    Hardship   19
    Enter College or University   158
    Erroneous Enlistment   5
    Motion Sickness   2
    Obesity   1
    Overheight   1
    Low GCT/Physical/Mental Conditions, Not a Disability   19
    Security   1
    Separation for Other Good and Sufficient Reasons   7

Medical
    Medical Disability EPTES[a], No Severance Pay,
        Disqualification   61
    Medical Disability EPTES[a], No Severance Pay,
        PEB Board   11
    Medical Disability Misconduct, No Severance Pay   5
    Medical Disability Not EPTES[a], No Severance Pay   1
    Medical Disability, Permanent Medical Retirement   8
    Medical Disability, Severance Pay   121
    Medical Disability, Temporary Medical Retirement   53

Unsuitability
    Apathy, Defective Attitudes   63
    Financial Irresponsibility   1
    Fraudulent Enlistment   20
    Good of Service   78
    Substandard Performance   96

(*table continues*)

Reasons for Separation From Navy Service
as Determined From Loss Codes
(*continued*)

Personality
    Personality Disorder   557

Legal
    Convicted by Civil Court   15
    Court Martial   39
    Court Martial Desertion   1
    Frequent Involvement With Civil or
        Military Authority   186
    Unauthorized Absence 1 Year or More   2
    Misconduct, Commission of a Serious Offense   1

Deleted From Analysis[b]
    Died on Active Duty   19
    Alcohol Abuse   5
    Drug Abuse   33
    Drug Abuse, Other Than Alcohol   9
    Inaptitude[c]   15
    Homosexual Activity   38
    Homosexual Tendencies   17
    Sexual Perversion   1
    Homosexual Act   1

[a]"EPTES" indicates that the problem existed prior to entering the service.

[b]The subjects deleted from the analysis were discharged for reasons that did not clearly fit any of the major classification categories. The total number of deleted cases (n = 138) comprised 0.3% of the sample.

[c]Inaptitude discharges were based on mental ability limitations. As such, these discharges were potentially distinct from instances where the person was capable of satisfactory performance but lacked the character to expend the requisite effort. Dropping this group from the unsuitability category was expected to leave a group that would be more uniform in having personality or character attributes as the basis for discharge.

Appendix D

Effects of Scale Limitations and Scale on Validity Coefficients

<u>Issues</u>

The raw correlations between the performance criteria and individual differences have been reported in the <u>Results</u> section of this paper. The correlations were modest on the whole, but sufficient to suggest that personality predicts general adjustment to the Navy.

Methodological factors influence the size of validity coefficients. This appendix explores the impact of two relevant factors, reliability of the predictor scales, and the use of dichotomous criteria to represent what may be a continuum.

Validity coefficients decrease as scale reliabilities decrease. The general formula for this relationship is:

Observed Correlation = True Correlation * SQRT$(r_{xx} * r_{yy})$

In this equation, "SQRT" indicates the square root of the value, r_{xx} indicates the reliablity of one of the two variables (typically the predictor variable when a predictor-criterion pair is considered) and r_{yy} the reliability of the second variable (i.e., the criterion or dependent variable). Reliability for any measure can range from .00 to 1.00. Only when the value is 1.00 for both variables involved in the correlation will the observed correlation equal the true correlation. Given that many of the FHIDs in the present study had reliabilities between .50 and .60, the formula implies that the true correlations may be 1.7 to 2.0 times as large as the observed correlation. Given that the domain scales generally had higher reliabilities, conclusions regarding the predictive power of domain and FHID scales may have been biased in favor of the domain scales.

Dichotomous criteria also can contribute to the underestimation of validity coefficients. Underestimation occurs when a dichotomy is used to represent an attribute that truly is a continuous variable (Wherry, 1984). The more extreme the split, the greater the underestimation (i.e., a 90-10 split underestimates more than a 50-50 split).

<u>Approach</u>

The effects of reliability and dichotomization on the present findings were estimated by applying appropriate formulae to the observed correlations. Correlations were corrected for attenuation due to measurement error by transforming the formula relating true correlations, observed correlations, and reliabilities given above to yield:

Estimated True Correlation = Observed Correlation/SQRT(r_{xx})

Note that this correction involves adjustment only for the known unreliability of the predictor variable. The measurement precision of the dependent variable is not known so the conservative assumption was made that this variable had no measurement error. As a result, even the estimated true correlations are likely to be less than the true population correlations.

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Corrections for the effects of dichotomizing a presumably continuous adjustment variable were computed by derivations from a formula for the biserial correlation given by Wherry (1984). The formula was:

$$r_{bis} = r_{pb} * SQRT(p*q)/h$$

where the correlation subscripts "bis" and "pb" indicate the biserial and point biserial correlations, respectively. The dichotomization of the continuous variable determines p, the probability of a positive outcome, and q, the probability of a negative outcome ($q = 1-p$). Reference to the presumed distribution of the underlying continuous variable yields h, the density of the standardized normal probability curve at the point equivalent to the split for the criterion (e.g., the height of the curve at the z-value for the 80th percentile if the split were 80-20).

A final estimate of the true population correlation was provided by combining the corrections. In this case, r_{bis} was divided by the reliability of the predictor. The effect is an estimate of the correlation that would be obtained if the personality attributes were measured with perfect accuracy and the criterion were measured as a continuous variable. This combination of corrections provided an estimated upper limit for the true population correlation.

Results

Table D-1 summarizes the effects of adjusting for the psychometric limitations of the predictor and criterion measures. Restricting attention to the personality variables, 11.7% (28 of 240) of raw correlations met the minimum effect size criterion. The estimated disattenuated correlations indicated this figure increased to 23.3% (56 of 240) if attenuation due to measurement error could be eliminated. The biserial correlations indicated that more sensitive measurement of adjustment would yield correlations

Table D-1

Summary of Raw and Adjusted Effect Sizes

| | Personality | | Mental Ability | |
	Low	Mod	Low	Mod
Raw Correlations	28	0	7	1
Disattenuated Raw	56	0	7	1
Biserial Correlations	50	0	7	2
Disattenuated Biserial	74	1	7	2

Note. "Low" indicates a correlation in Cohen's (1969) small effect size range (.099 < absolute r < .300). "Mod" indicates a correlation in Cohen's (1969) moderate effect size range (.299 < absolute r < .600). "Raw Correlations" are the observed bivariate correlations. "Disattenuated Correlations" are raw correlations adjusted for the unreliability of the personality measures (Lord & Novick, 1968). "Biserial Correlations" were the raw point biserial correlations transformed to biserial correlations as described by Wherry (1984). "Disattenuated Biserial" adjusted the biserial correlations for attenuation.

meeting the minimum criterion 25% (50 of 200) of the time. Combining the adjustments would result in 37% (74 of 200) of the personality-performance relationships meeting the minimum criterion. The last two figures are based on 200 correlations rather than 240 correlations because the biserial adjustment was not applicable to the paygrade criterion. The adjustment did not apply to paygrade findings because that criterion involved four levels rather than two.

The results just noted underscore the likely existence of widespread relationships between personality and performance. Substantial gains would result from improving the assessments of either the predictors or the criteria. However, the relationships were modest in magnitude even after correction, with only one correlation greater than $r = .30$ (absolute), even when both corrections were combined (Lack of Depression with School Success, disattenuated biserial correlation, $r = -.35$)

Adjustments had less effect on the estimated relationships for mental ability. This difference between mental ability and personality was due largely to the fact that the mental ability measures have a high level of reliability. Adjusting for reliability, therefore, did not increase those correlations very much. However, the various adjustments did increase the number of correlations exceeding the minimum acceptability criterion from 8 (7 minimal + 1 in moderate effect size range) to 9 (7 minimal + 2 moderate). Thus, these adjustment produced only a modest impact on the distribution of relationships.

Implications

Improvements in the measurement of personality and/or the adjustment criterion could substantially affect conclusions regarding the utility of personality measures in forecasting career success. Three specific examples are noted as representative of possible gains[8]:

a. Some personality measures are competitive with mental ability as predictors of career criteria. The raw correlations between mental ability and school success were much larger than the raw correlations for personality variables. The primary basis for this difference may be differences in measurement precision rather than differences in true predictive utility. Some personality variables approach the level of predictive accuracy after adjustments are made. For example, the adjusted r for the Lack of Depression FHID with school success was $r = .27$ compared with $r = .35$ for GCT. The .08 difference in favor of mental ability is less than the .12 difference in the raw correlations.

b. Some personality measures that appeared unimportant when examining the prior raw correlations became more important once measurement limitations are taken into account. The most notable examples are the correlations between school success and the FHID of Lack of Paranoia. Without correction, the correlation for this personality predictor was below the effect size criterion ($r = .08$). With correction for attenuation and the dichotomous nature of the criterion, the correlation between Lack of Paranoia and school success was well above the minimum acceptability criterion ($r = .18$). Eight other FHIDs had higher raw correlations than Lack of Paranoia, but lower adjusted correlations. The difference occurred because the

reliability of the kindness measure was exceptionally low. Thus, the adjustments can affect the rank ordering of predictors with respect to predictive power.

c. Criteria that initially appear unrelated to personality now demonstrate associations meeting the effect size criterion. The decision to reenlist appeared virtually independent of personality in the initial analyses, but produced a diffuse pattern of associations involving Lack of Cynicism, Routine, Law Enforcement, Intolerance for Nonconformity, Liking for Work, Lack of Selfishness, and Service when both corrections were introduced.

In addition to the foregoing points which involve changes from null findings to positive findings, other trends in the data that contributed importantly to the study conclusions were reinforced by the adjustments. One conclusion was that the FHID level of measurement is preferable to the domain level of measurement when analyzing the personality antecedents of career success. After adjustment, there was only a single instance (Conformity with Adjustment) in which a domain scale produced an association in which the domain measure met the effect size criterion and was a stronger predictor than the FHIDs. Even in this case, two FHIDs were approximately comparable in predictive strength.

Conclusions

Measurement limitations on both sides of the personality-career success equation may significantly affect some conclusions drawn from this study. Unreliability of the FHID scales appears to be a major reason for the general appearance that personality is weakly related to career events. Adopting the narrower constructs of FHIDs as the proper level of personality measurement and developing reliable measures of relevant FHIDs could yield measures with substantial utility for career forecasting, including predictions of reenlistment recommendations and reenlistment.

The positive tenor of the preceding conclusion must be tempered by recognition that the adjusted correlations summarized in Table D-1 are only theoretical possibilities at present. It may be impossible to produce personality scales with reliabilities that approach 1.00. The development of continuous measures of adaptation to the service may be inappropriate or even counterproductive because it is the dichotomous behavioral expressions of adaptation that are of concern to Navy decision-makers. Any immediate practical application of the findings must rely on the personality measures and performance criteria presently available. The bivariate and multivariate results presented in the main body of the paper are better embodiments of what would be expected in practice using available measures than are the larger correlations presented in this appendix. However, the extensions of the basic analyses do illustrate that personality measures can approach the predictive validity of mental ability, the best available psychometric forecasting device, if the appropriate personality measures are chosen and assessed with sufficient precision.

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Vickers, Jr., R. R., Hervig, L. K., & Booth, R. F.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Health Research Center
P. O. Box 85122
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Personality may affect success in the military. The present study examined personality predictors of success in a sample of 4,512 male U.S. Navy corpsmen. A career sequence perspective was adopted to define success indicators, including completion of specialty training, premature attrition arising from behavioral problems (especially personality disorders), end-of-tour paygrade for those who completed their obligated service, and reenlistment decisions. Personality predicted career criteria, even controlling for differences in mental ability. Personality was more useful for predicting early career events, including school success and attrition, than for predicting later events, including end-of-tour paygrade and reenlistment decisions. Specific facets of personality predicted career criteria better than the general dimensions which included the facets. Personality measures can help forecast some aspects of career success if the relevant personality facets can be identified and measured accurately. Predictive equations provided in this study provide a starting point for refining prediction by more systematic sampling of personality facets and improved measurement of sampled facets.

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